

Evaluation of an Environmentally Compliant Aerospace Coating Remover

*Hazardous Minimization and Green Products Branch
DLA Aviation, Richmond Virginia
with
Air Force Research Laboratory
Support Division*



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Agenda



- **DLA-Aviation Sustainability**
- **DLA/Air Force Activities**
- **AFRL Mission**
- **Coating Remover Details**
- **Project Plans**
- **Contact Info-Questions**





Sustainable Products Program



- Hazardous Minimization and Green Products Branch
 - Officially established in March 2009
 - Operational framework in existence since fall 2008
 - Branch of Engineers and Chemists
- Supports DLA Aviation to increase the number of sustainable products, offerings and orders
- Facilitates the development of New Services and Products that decrease life cycle costs
- Technical Resource for DLA Enterprise



PROJECT TEAM



- **DLA**
 - Mr. Frank DiPofi, DLA Aviation
- **Air Force**
 - Mr. Jeff Kingsley, AFRL/RXSA
- **Stakeholder Team**
 - Ms. Diane Kleinschmidt, NAVAIR
 - Ms. Louise Nguyen, OC-ALC Dem/Val Support
 - Mr. David Ellicks, AFCPCO
- **Battelle**
 - Ms. Annie Lane, Program Manager
 - Mr. John Stropki, Technical Lead





BACKGROUND



- Methylene chloride-based paint strippers have been replaced by environmentally compliant peroxide-assisted benzyl alcohol strippers
- These strippers have acceptable coating removal rates with minimal physical damage to metallic substrates
- However, several major drawbacks exist, including:
- Limited effectiveness on coating stack-ups containing new non-Cr pretreatments
- Potential for damage to resins used in structural composites



BACKGROUND



- AFRL, NAVAIR, UDRI and Battelle recently completed ESTCP Project WP-0621 to evaluate environmentally compliant removers for aircraft sealants
- In the course of this testing, the Polygone 310 AG product showed potential for transition to coating removal applications
- Environmentally friendly product containing no TRI chemicals, HAPs or chlorinated compounds
- Passed stringent corrosion testing requirements for sandwich corrosion, hydrogen embrittlement and total immersion corrosion
- Effectively removed Air Force approved aerospace coatings from Al2024-T3 panels in less than 45 minutes



POLYGON 310 AG CORROSION TESTING RESULTS



Sandwich Corrosion: No corrosion observed on 2024 and 7075 coupons

Hydrogen Embrittlement: Four test specimens exceeded 75% NFS sustained load for 200 hours

Effects on Painted Surfaces: Product performed complete coating removal within 30 minutes

Total Immersion Corrosion: Product met corrosion limits as specified

Test	Specification	Results
Sandwich Corrosion	ASTM F1110	✓
Hydrogen Embrittlement	ASTM F519	✓
Effects on Painted Surfaces	ASTM F502	✗
Total Immersion Corrosion	ASTM F484	✓

PolyGone 310 AG now being considered as compliant coating remover by USAF as a result of NAVAIR testing

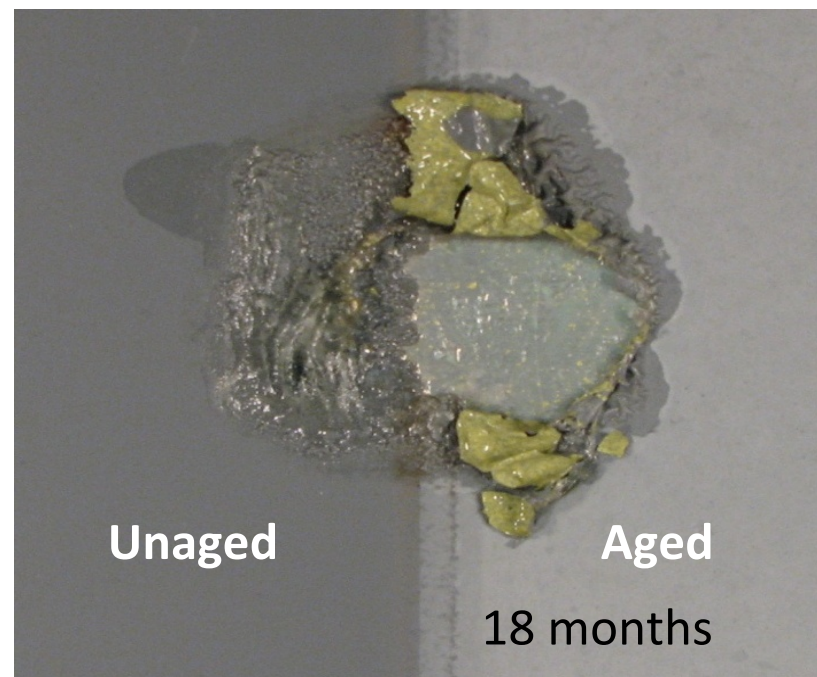
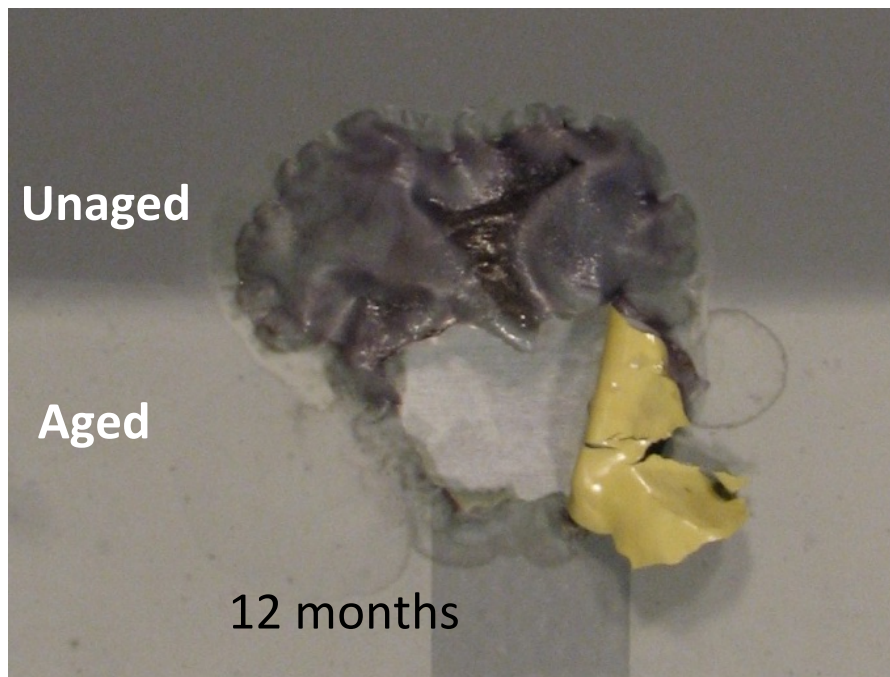


PRELIMINARY COATING REMOVAL RESULTS



Preliminary laboratory demonstration of coating removal

- Product: Polygone 310-AG (Gel), Sample Lot No. 100324A
- Al2024-T3 Coated Test Panels
- Air Force T.O. 1-1-8 approved coating system stack-up:
 1. MIL-C-5541 chromate conversion coating,
 2. MIL-PRF-23377F chromated epoxy primer
 3. MIL-PRF-85285 APC topcoat
- Total Dry Film Thickness ~3.0 mils (0.003 inches)
- Beachfront exposure at Battelle's Florida Materials Research Facility

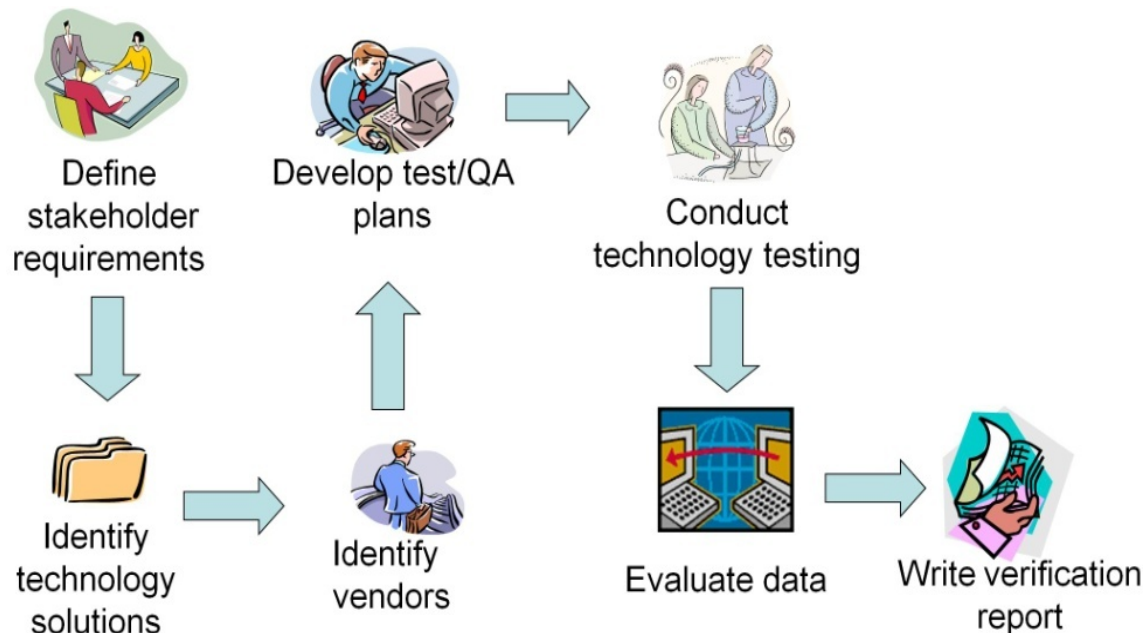




TECHNICAL OBJECTIVE



- Conduct an unbiased evaluation of an alternative, environmentally friendly chemical coating remover for utilization in Air Force, Navy and other DoD depainting operations
- Utilize the **Environmental Technology Verification (ETV)** process developed by Battelle for the EPA





TECHNICAL APPROACH



Phase I

- **Task 1. Requirements Definition**
 - Establish stakeholder team
 - Identify requirements to qualify alternative coating remover to applicable MIL-SPECs, T.O.'s, Technical Manuals, Process Orders, etc.
- **Task 2. Test Plan Development**
 - Establish qualification test plan for evaluation of requirements not addressed in previous testing conducted by the AFRL, OC-ALC and NAVAIR
- **Task 3. Laboratory Testing**
 - Evaluate coating remover performance for inclusion in T.O. 1-1-8
 - Perform additional materials testing to address requirements from TT-R-2918A, T.O. 1-1-24, etc.
 - Benchmark against current approved coating removers



TECHNICAL APPROACH



Phase II

- **Task 4. Field Testing**
 - Perform field demonstration/validation testing at an AF depot and Navy FRC to support product use and implementation
 - Conduct comparative testing on off-aircraft component parts and aircraft structures
- **Task 5. Results Documentation**
 - Summarize program results in a final report
- **Task 6. Technology Transition**
 - Support process owners in updating technical documents such as T.O. 1-1-8 and applicable Navy Technical Manuals
 - Establish NSNs for alternative removers



Contact Information-Questions



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Any Remaining Questions?